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ABSTRACT

This paper examines the effect of student perceptions of the learning environment on their satisfaction with that environment. Teacher education students (N=130) completed the College and University Classroom Environment Inventory (CUCEI) prior to and at the end of a semester unit in educational psychology. The CUCEI consists of seven scales: personalization, involvement, student cohesiveness, satisfaction, task orientation, innovation, and individualization. Four discrete groups of students are identified for each scale: independents (low actual-low dissonance), acerbics (low actual-high dissonance), empathetics (high actual-low dissonance), and impresseds (high actual-high dissonance). For each scale, the level of actual satisfaction for each group is computed. Initial analysis indicates a strong course effect. Subsequent analysis indicates that for Arts/Humanities students satisfaction is related to actual perceptions of a number of classroom psychosocial characteristics, and for Science/Technology students satisfaction is related to the dissonance between actual and preferred perceptions on some characteristics. The results are explained in terms of the types of students attracted to the different courses and the history and ethos of teacher education institutions. Implications for teacher education are discussed. A description of the CUCEI and nine tables are appended. (AMH)

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The influence of learning environment on the satisfaction of pre-service teacher education students

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The influence of learning environment on the satisfaction of pre-service teacher education students

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ABSTRACT

This paper examines the effect of student perceptions of the learning environment on their satisfaction with that environment. Previous research has focussed either on the influence of actual perceptions or the influence of dissonance between preferred and actual perceptions *per se*. This study extends that work by suggesting that, depending on the circumstances, it may be actual perceptions, dissonance in perceptions, or some combination of these that is more influential. 130 teacher education students in a 3 year integrated course and from a variety of content area backgrounds classified either as an Arts/Humanities or a Science/Technology course completed the College and University Classroom Environment Inventory (CUCEI) prior to (preferred) and at the end of (actual) a semester unit in Educational Psychology. The CUCEI consists of 7 scales: Personalization, Involvement, Student Cohesiveness, Satisfaction, Task Orientation, Innovation and Individualization.

On the assumption that classroom behaviour is complex and perhaps not realistically explicable by strongly parameterized statistical models, a categorical model explaining student satisfaction is built up from the data by making few assumptions about the statistical characteristics of the data. Four discrete groups of students are identified for each scale: Low actual-low dissonance (labelled INDEPENDENTS), low actual-high dissonance (ACERBICS), high actual-low dissonance (EMPATHETICS) and high actual-high dissonance (IMPRESSEDS) and for each scale, the level of actual satisfaction for each group is computed. Initial analysis indicates that there is a strong course effect. Subsequent analysis carried out on Arts/Humanities and Science/Technology students separately indicates that for the former, satisfaction is related to actual perceptions of a number of classroom psychosocial characteristics, while, for the latter, satisfaction is related to the dissonance between actual and preferred perceptions on some characteristics. The results are explained in terms of the types of students attracted to the different courses and the history and ethos of teacher education institutions. Implications for teacher educators are discussed.

In addition, the validity of the CUCEI is checked, with scale reliability measures using both the student and the class as the unit of analysis confirming for the most part the already reported internal consistency of the 7 scales. Also, the four groups of INDEPENDENTS, ACERBICS, EMPATHETICS and IMPRESSEDS tend to behave in a way that is theoretically predictable and may well be worthy of further research.

The Study of Learning Project

The Study of Learning Project is a large scale research project being undertaken by the authors which has the aim of improving the learning environments of, and the approach to study taken by, tertiary students. It is investigating the interaction between their learning styles and learning processes, their preferred and actual perceptions of their learning environment and cognitive and affective outcomes of their learning experiences. Data on all of the above has been collected over a semester period from students in both integrated and end-on preservice teacher education courses in a large metropolitan teacher education institution. This paper focuses on one aspect of that data - the influence of the perceptions of the learning environment on the satisfaction of students in integrated courses.

Learning Environment Research

There is a twenty year long and rich history of research on learning environments in primary and secondary schools. The prolific work of Moos (Moos; 1979), Walberg (Walberg, 1976, 1979) and in particular Fraser (Fraser, 1980, 1981a, 1981b, 1985a, 1985b) both individually and together (Fraser and Walberg, 1981; Fraser, Anderson and Walberg, 1982) has produced not only a substantial body of research findings but also a collection of reliable and validated instruments for measuring the psychosocial characteristics of actual and preferred classrooms. These instruments include the *Learning Environment Inventory* (Anderson and Walberg, 1974; Fraser, Anderson and Walberg, 1982), its simplified version the *My Class Inventory* (Fisher and Fraser, 1981; Fraser, Anderson

and Walberg, 1982), the *Classroom Environment Scale* (Trickett and Moos, 1973; Moos and Trickett, 1984) and the *Individualized Classroom Environment Questionnaire* (Fraser, 1985c; Rentoul and Fraser, 1979). The description, development, validation and research associated with these instruments are reviewed in detail by Clarke (1987).

In response to the dearth of comparable research at the tertiary level,[1] Fraser and his co-workers (Fraser and Tregaust, 1986; Fraser, Tregaust and Dennis, 1984) recently developed and validated an instrument for use in post-secondary education, the *College and University Classroom Environment Inventory* (CUCEI). The instrument is designed for use with small higher education classes (e.g. seminars, tutorials) and contains seven scales: Individualization, Innovation, Involvement, Personalization, Satisfaction, Student Cohesiveness and Task Orientation. Descriptions of, and a typical item associated with, each scale is shown in Table 1.

Table 1 somewhere here

In using this instrument, Fraser and Tregaust (1986) report that Satisfaction was higher in classrooms characterized by greater Personalization, Involvement, Student Cohesiveness,

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1 Although there has been some notable work focussing on the institutional level (e.g. Halpin and Croft, 1963; Pace and Stern, 1958; Stern, 1970), there has been limited studies at the classroom level (e.g. Genn; 1975) and instrument development seems to have focussed on specific environments, in particular medical schools (e.g. Feletti, 1983; Feletti and Clarke, 1981; Marshall, 1978; Wakeford, 1984).

Task Orientation, Innovation and Individualization and that, with other climate variables held constant, Satisfaction was significantly greater in more cohesive and task-oriented classrooms.

However, they note that "...further research is needed before too much confidence is placed in the specific results... It would be desirable to replicate the research with other samples..." (Fraser and Tregaust; 1986, 47-48). They also note that, since pre-tertiary research has revealed that "...student outcomes depend, not only on the nature of the actual classroom environment, but also on the match between students' preferences and the actual environment" (ibid; p. 51), another desirable direction for further research with the CUCEI is "...to replicate this line of research in higher education" (ibid).

With regard to the discussion above, this paper has two aims:-

(a) to provide further validation data for the CUCEI; and

(b) to use the CUCEI to investigate the factors influencing the satisfaction of preservice teacher education students with their learning environments. It extends previous theory and research in this area by examining combinations of "actual" and "dissonance" perceptions and in so doing, identifies different types of students based on these combinations.

Combinations of "Actual Perceptions" and "Dissonance in Perceptions"

One of the features and advantages of the CUCEI is that it

allows data to be collected in two forms - actual and preferred perceptions of the learning environment. This allows a measure of dissonance to be obtained. Such dissonance has been used as a measure of person-environment fit in determining student outcomes (Fraser and Fisher; 1983a, 1983b).

One of the problems of considering the dissonance between actual and preferred perceptions alone is that within a group of students whose dissonance is high, there are those who may have either high or low actual perceptions. Similarly, among a group of students whose dissonance is low, there are students whose actual perceptions may be either high or low. In a matrix form, these groups would be

		Dissonance	
		Low	High
Actual Perceptions	Low	A	B
	High	C	D

Each of these groups could well behave differently. A possible "pen-picture" of each group is given below.

GROUP A Low Actual - Low Dissonance

Low expectations matched by low actual perceptions.

> *This group don't expect much and don't get much. Even though they are not impressed with the environment, there is a low probability of them being influenced by it because they don't expect much anyway. Their levels of satisfaction are likely to be independent of the environment.*

This group could be labelled "INDEPENDENTS".

GROUP B Low Actual - High Dissonance

High expectations not matched by actual perceptions

> *This group expect a fair bit but don't get it. Like GROUP A, they are not impressed with the environment but there is a high probability of them being influenced by it because they are likely to be disillusioned. Their level of satisfaction in all probability will reflect that.*

This group could be labelled the "ACERBICS".

GROUP C High Actual - Low Dissonance

High expectations matched by high actual perceptions

> *This group expect a fair bit and get it. They are impressed with the environment and there is a high probability of being influenced by it because they are likely to feel an empathy with the environment. Their satisfaction will most likely reflect that.*

This group could be labelled the "EMPATHETICS"

GROUP D High Actual - High Dissonance

Low expectations exceeded by actual perceptions

> *This group don't expect much but get a fair bit. They are likely to be most impressed with the environment and consequently, there is a high probability of them being influenced by it. Their satisfaction will most likely reflect that.*

This group could be labelled the "IMPRESSEDS".

Although speculative, a possible expectation of how satisfied these groups would be with their learning environments *relative to each other* could be IMPRESSEDS > or = EMPATHETICS > ACERBICS with the behaviour of INDEPENDENTS being unpredictable.

Previous theory and research has focussed on those students whose dissonance has been relatively high or low with the

prediction that the latter would be more satisfied than the former. The corresponding groups in the matrix above are Group B, the ACERBICS and Group C, the EMPATHETICS. The model proposed in the matrix identifies two additional groups - A, the INDEPENDENTS and D, the IMPRESSEDS.

Other relevant information that is available about the students is their gender and discipline orientation of their course. A typical input-process-output research model summarizing this is shown in Figure 1. Note that the outcome variable of satisfaction is obtained from the students' actual perceptions of Satisfaction, one of the CUCEI scales.

Figure 1 somewhere here

Sample and Methodology

The sample consists of 130 teacher education students in 10 classes with 8 lecturers in a large tertiary education institution in Brisbane, Australia. All students are involved in a 3 year preservice integrated teacher education course and are from a variety of content area specializations ("Principal Teaching Areas" or PTAs). These PTAs are classified either as Arts/Humanities (Art, Drama, English, Foreign Languages, Music, Social Sciences) (N = 46) or Science/Technology (Commercial, Home Economics, Mathematics, Physical Education, Science) (N = 84).

In the semester in which this study was carried out, semester 2 of 1988, the students were enrolled in a compulsory unit called "Educational Psychology". This is a unit in the

Studies in Education strand of their course. The students are in their second or third year of their course and have already completed two foundation units in that strand viz. "Learners and Teachers" and "School, Community and Society".

In week 1 of the semester involving "Educational Psychology", students indicated what they hoped would happen in that unit by completing the Preferred Form of the CUCEI along with information on their age, sex and PTA. In the final week of the semester, students indicated their perceptions of what actually happened in the "Educational Psychology" unit by completing the Actual Form of the CUCEI.

Analysis and Results

(a) Analysis of the CUCEI

1. *Description and Reliability of the Scales*

Relevant descriptive statistics associated with each scale, reported for all students and also by gender and course, are shown in Table 2.

Table 2 somewhere here

The *Cronbach alpha* measure of reliability (Cronbach; 1951) was calculated for each scale using both the student and the class as the unit of analysis. Fraser (1985a), although acknowledging the validity of both units of analysis, puts forward a case for the class as the more appropriate unit. Both are reported here. In this study however, the "class" data may be a little questionable because there are only 10 classes. The results and a comparison with already published

validity data based on 372 students in 34 classes (Fraser and Tregaust; 1986) is shown in Table 3.

Table 3 somewhere here

The results obtained here and the already published results are very similar with the exception of the Task Orientation scale.

2. *Some Characteristics of the Scales*

From the large number of comparisons that can be made among the data in Table 2, a set of summary statements about the preferred and actual perceptions for each scale related to the major Presage Variables is given below.

All students:-

(i) As a total group of students, there are significant differences between the actual and preferred perceptions on Personalization (act > pref); $p = 0.001$, Involvement (act > pref); $p < 0.001$, Task Orientation (act > pref); $p < 0.001$, Innovation (pref > act); $p < 0.05$ and Individualization (act > pref); $p < 0.001$

Males and Females:-

(ii) There are no significant differences between the preferred perceptions of males and females on any scale.

(iii) There are no significant differences between the actual perceptions of males and females on any scale.

(iv) There are significant differences between the preferred (pref) and actual (act) perceptions of males on Personalization (act > pref); $p < 0.05$), Involvement (act > pref; $p < 0.001$), Task Orientation (act > pref); $p < 0.001$ and Individualization (act > pref; $p < 0.05$).

(v) There are significant differences between the preferred and actual perceptions of females on Personalization (act > pref; $p < 0.001$), Involvement (act > pref; $p < 0.001$), Task Orientation (act > pref); $p < 0.001$, Innovation (pref > act; $p < 0.05$) and Individualization (act > pref; $p < 0.001$).

Arts/Humanities and Science/Technology Students:-

(vi) There are no significant differences between the

preferred perceptions of Arts/Humanities students and Science/Technology students on any scale with the exception of Innovation where the former have higher expectations than the latter ($p < 0.05$).

(vii) There are no significant differences between the actual perceptions of Arts/Humanities students and Science/Technology students on any scale.

(viii) There are significant differences between the preferred and actual perceptions of Arts/Humanities students on Personalization (act > pref; $p < 0.05$), Involvement (act > pref; $p < 0.001$), Task Orientation (act > pref; $p < 0.001$), Innovation (pref > act; $p < 0.05$) and Individualization (act > pref; $p < 0.05$).

(ix) There are significant differences between the preferred and actual perceptions of Science/Technology students on Personalization (act > pref; $p < 0.01$), Involvement (act > pref; $p < 0.001$), Task Orientation (act > pref; $p < 0.001$) and Individualization (act > pref; $p < 0.001$).

In summary, where "Y" means Yes and "N" means No:

	All	M	F	A/H	S/T
Significantly more than what was expected					
- Personalization	Y	Y	Y	Y	Y
- Involvement	Y	Y	Y	Y	Y
- Task Orientation	Y	Y	Y	Y	Y
- Individualization	Y	Y	Y	Y	Y
Significantly less than what was expected					
- Innovation	Y	N	Y	Y	N

(b) Major Analysis

1. *Rationale for the Analytic Procedure Used*

In situations where there are a multitude of independent variables being related to a dependent variable, the tendency is to impose some form of modelling procedure that is strongly parametric. The usual choice is normally a variant of multiple linear regression which attempts to identify

significant relationships. The authors previous experience with linear regression and, in particular, the interpretation of interaction factors (Clarke, Dart and Chant; 1988) indicates that because of the complexity of classroom life, such an approach may well be inappropriate. The approach adopted here is that a model of what is happening is built "from the ground up" rather than being imposed at the outset. In similar vein, statistical processes that make as few assumptions as possible about the data are probably more appropriate than those procedures that require specific statistical characteristics of the data. Hence, procedures that are essentially non-parametric are preferable. Once a model is developed on the basis of a minimal set of statistical assumptions, it may then be appropriate to apply more rigorous parametric procedures by way of complementary analysis.

The steps involved in the approach are
(i) Classify students as INDEPENDENTS, ACERBICS, EMPATHETICS or IMPRESSEDS by a median split on each scale.
(ii) Look for any major effects which could influence how subsequent analysis should proceed.
(iii) Within any "major effect", identify any significant relationships between each of the scales and Satisfaction.
(iv) develop a model from the relationships identified, and
(v) apply any appropriate complementary analysis procedure.

2. *Outcomes of the Process*

The outcomes of testing for any major effects are shown in Tables 4 and 5. Students are nominated as having high

satisfaction if their Actual Satisfaction score is strictly above the median Actual Satisfaction score for all students. They are nominated as having low satisfaction if their Actual Satisfaction score is strictly below the median Actual Satisfaction score for all students. Students are classified by gender and course in Table 4 and the percentage of each subgroup who obtained more than the median Actual Satisfaction score is indicated.

Table 4 somewhere here

For example, the first cell of Table 4 indicates that there are 16 male Arts/Humanities students. 5 of these had Actual Satisfaction scores below the median Actual Satisfaction score and 11 had scores above, a percentage of 68.8%.

Maintaining the categorical modelling approach and consistent with Kennedy's (1988) approach to educational research, the data in Table 4 was analyzed by a logistic regression analysis (Wilkinson; 1988) and the results are shown in Table 5. The latter identifies a significant course effect and Table 4 indicates that it is the Arts/Humanities students who are generally more satisfied than the Science/Technology students. There is no significant gender effect.

Table 5 somewhere here

Because there is a significant main effect for course, subsequent analysis deals with Arts/Humanities and Science/ Technology students separately. The relationships between

Satisfaction and each of the other CUCEI scales for students in each course are shown in Table 6.

Table 6 somewhere here

This table is quite comprehensive and indicates for each scale the relationship between the actual perceptions and the dissonance in perceptions for those students who have indicated high or low satisfaction with their learning environment.

For example, with respect to Personalization for Science/ Technology students:

- there are 5 students who have "low actual" and "low dissonance" perceptions (INDEPENDENTS); there are 34 ACERBICS (low actual-high dissonance), 22 EMPATHETICS (high actual-low dissonance) and 7 IMPRESSEDS (high actual-high dissonance).
- Of the 5 INDEPENDENTS, 1 is below the median Actual Satisfaction score for all students and 4 are above, the latter a percentage of 80%; the percentage of ACERBICS, EMPATHETICS and IMPRESSEDS who indicate high Actual Satisfaction are 17.6%, 68.2% and 42.9% respectively.
- The expected rank ordering (E) of the groups as predicted on page 5 matches the observed rank ordering (O).

The data in Table 6 was analyzed by a logistic regression analysis and the results are presented in Table 7.

Table 7 somewhere here

This indicates that Satisfaction in Arts/Humanities students is significantly related to Actual Personalization and Involvement along with a statistical Actual x Dissonance interaction on Student Cohesiveness. On the other hand, the Satisfaction of Science/Technology students is significantly related to Dissonance on Personalization, Involvement and Individualization and Actual Involvement.

3. *Complementary Analysis*

By way of providing a complementary analysis, the data were also analyzed by fitting a simple structural equations model via LISREL (Joreskog and Sorbum; 1988). The scheme of the model is given in Figure 2 and the results of the analysis are presented in Table 8.

Table 8 somewhere here

They indicate that some of the relationships identified in the categorical model re-emerge: for the Arts/Humanities students, the Actual Involvement is significant as is the Actual x Dissonance interaction on Student Cohesiveness. For the Science/Technology students, Actual Involvement is significant and Dissonance on Individualization is approaching significance.

Summary of All Major Outcomes

(a) CUCEI Scales

1. *Reliability.*

With the exception of the Task Orientation Scale, the reliability of the CUCEI scales matches previously published

results.

2. *Student Responses to the Scales*

- There were no significant differences between the actual perceptions of any sub-groups of students (male/ female, Arts/Humanities-Science/Technology) or in the preferred perceptions (expectations) of any sub-groups of students with the exception that Arts/Humanities students expected classes to be more innovative than the Science/Technology students did.

- There were significant differences, consistent across most sub-groups, between the actual and preferred perceptions of students on Personalization, Involvement, Task Orientation, Individualization and Innovation. Contrary to student expectations, classrooms were more personable, there was more opportunity to get involved in classroom activities, classes were more well organized and catered more for student individual differences. On the other hand, classrooms produced significantly less innovative and exciting classroom activities than students wanted.

(b) Major Analysis

- The satisfaction of Arts/Humanities students is significantly related to Actual Personalization and Involvement and Actual x Dissonance interaction on Student Cohesiveness.

- The satisfaction of Science/Technology students is significantly related to Actual Involvement and Dissonance on Personalization, Involvement and Individualization.

- Students can be grouped on the basis of combinations of

high and low Actual and Dissonance perceptions to produce groups whose behaviour can be predicted with considerable success.

Discussion of Results

(a) CUCEI

- *With regard to the Instrument*

With the exception of the Task Orientation scale, the CUCEI scales performed as predicted by its developers. On the whole, reliability outcomes are similar to already published data. The difference in sample sizes and the different types of students in both samples could account for some of the variations. The failure of the Preferred Form of the Task Orientation scale to perform adequately using the class as the unit of analysis may be explained by the small number of classes.

- *With regard to students reactions to learning environments*

There are two major findings here, both of some significance to teacher educators. First, the generally low expectations that students have of their teacher education course and second their desire for more innovative teaching practices in their own learning situations. The psychosocial characteristics of learning environments are determined by the participants in the learning environments but are influenced by the ethos of the institution and the total course. It would seem that the history of teacher education is such that teacher education courses are not perceived by students to be of particularly high quality on both cognitive (e.g. Task Orientation) and affective (e.g. Personalization)

dimensions. The implications of this and the desire by students for more innovative teaching is discussed later.

(b) Satisfaction

The major general outcome here is that, as hypothesized, sometimes it is the actual perceptions of the classroom environment that are important and sometimes it is the dissonance between the actual and preferred perceptions that most influence behaviour. The particular finding here is that Arts/Humanities students are different from the Science/Technology students. Although this difference is a commonly accepted stereotype, its characterization here in terms of student perceptions sets it apart from previous research in this field (Hudson; 1967, 1970).

The most difficult outcome to explain is the statistically significant Actual x Dissonance interaction on the Student Cohesiveness scale for Arts/Humanities students. Table 6 provides an explanation. None of the INDEPENDENTS or IMPRESSEDS on the Student Cohesiveness scale are above the median for high satisfaction. Consequently, the Low Actuals increase markedly from Low to High Dissonance (0% to 63.6%) while the High Actuals decrease markedly from Low to High Dissonance (82.4% to 0%). Hence the significant interaction. In other words, the interaction is a statistical artifact caused by the low numbers in two groups. Within the LISREL framework, the same outcome emerges. However here, the interaction is modelled by an unwieldy set of cross product terms which obscure the simple explanation provided by the categorical model.

The other significant differences however have more substantive explanations. The satisfaction of both the Arts/Humanities and Science/Technology students in the main is related to how person-oriented their classrooms are and how much opportunity there is for them to get involved in the learning activities of the classroom. However, the two groups differ in that Arts/Humanities students respond to what they actually experience in their classrooms irrespective of what they expected to happen while Science/Technology students use their expectations as a yardstick against which to evaluate their learning experiences.

It should be noted that the Personalization outcome for the Arts/Humanities students is bought about in part by the low numbers of INDEPENDENTS. The effect is similar to the Actual x Dissonance interaction on Student Cohesiveness above although not to the same degree. However, this aside, the Arts/Humanities findings are consistent with but not as extensive as those of Fraser and Tregaust's (1986) who, in addition to Personalization and Involvement, found, by using a "...simple correlational analysis" (p. 46), a significant relationship between Satisfaction and Cohesiveness, Task Orientation, Innovation and Individualization.

For Science/Technology students, what is important is the dissonance between their preferred and actual perceptions of Personalization, Involvement and Individualization. There is no corresponding published research on the effect of dissonance on satisfaction at the tertiary level. Existing

research focuses on pre-tertiary students (Fraser and Fisher; 1983a, 1983b).

Of interest here is why there is this difference between the Arts/Humanities and Science/Technology students. Some speculations are:

- *Arts/Humanities students are "people" individuals while Science/Technology students are "thing" individuals.* In this context, "people" manifests itself as the actual behaviour of the lecturers, "thing" manifests itself as the more amorphous institution.

The "people" vs "thing" dichotomy is consistent with the research on the behaviour of field dependence/independence individuals. Arts/Humanities individuals are generally more field dependent than Science/Technology individuals (For a review, particularly as it relates to teachers of Arts/Humanities and Science/Technology content areas, see Witkin, Moore, Goodenough and Cox; 1977) and field-dependents are also more oriented to "people" than field-independents who prefer "things" (For a review, see Witkin and Goodenough; 1977). The focus of Science/Technology students is on the institutional context. Their expectations are of the course rather than the people running it and these expectations provide them with a frame of reference against which to evaluate their experiences.

- *The academic quality of the students*

Arts/Humanities students in this sample achieve at close to a significantly higher rate than the Science/Technology students. This is shown in Table 9 which summaries the

number of students in each course who achieve a 6 or 7 ("high") or 4 or 5 ("low") and also indicates the percentage of "highs"[2].

Table 9 somewhere here

It is difficult to interpret the finding that high achievers have satisfaction that is related to actual perceptions while low achievers have satisfaction that is related more to dissonance in perceptions. It could be argued, *albeit* rather speculatively, that high achievement is independent of dissonance because those students are simply "getting on with the job" of learning. They are not being hindered by a set of expectations which could be getting in the way of learning. In the latter situation, energy is used continually making comparisons between what is wanted and what is actually happening, leading to a decrement in achievement.

- *The career motivations of the students*

A significant number of the Science/Technology students move into teacher education by default - it is the last option available to them after missing out on a variety of other tertiary careers in the Science/Technology field. They have negative feelings towards teaching and the institution. These expectations tend to dominate their involvement with the institution and its courses. Hence, again, the

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The final achievement in the unit "Educational Psychology" is on a 7 point scale. However, the lowest rating achieved by students in this sample is 4

expectations are the yardstick against which learning environments are evaluated.

(c) Analysis Procedure Used

1. *Grouping of Students*

The grouping of students into INDEPENDENTS, ACERBICS, EMPATHETICS and IMPRESSEDS seems to have been successful in that the theoretical predictions of their behaviour as outlined on page 5 match quite well with the actual behaviour exhibited and summarized in Table 6. The rank order of the satisfaction of the INDEPENDENTS is random and therefore unpredictable while the rank ordering of the IMPRESSEDS, EMPATHETICS and ACERBICS is generally in line with predictions. It is not possible to explore these groups in depth here. They are however worthy of further research.

2. *Model Building*

The "building a model from the ground up" approach used here, one that makes few assumptions about the statistical characteristics of classroom data, appears to have been successful in the sense of generating a model of classroom behaviour which is not only realistic and comprehensible but also can be complemented by a more strongly parametric modelling procedure. The latter with its built-in statistical demands was not able to map the data as effectively as the categorical model. The generative approach used here is consistent with the authors ongoing development of a realistic approach to understanding classrooms (Clarke, Dart and Chant; 1988).

Implications for Teacher Educators

One of the advantages of focussing on Process Variables as

predictors of behaviour is that they are manipulable. If any can be shown to significantly influence behaviour, a change in behaviour can be brought about by manipulating the environment so that students' perceptions change (DeYoung, 1977; Fraser and Deer, 1983; Fraser, Seddon and Eagleson, 1983). This study has identified a number of psychosocial climate dimensions that are related to student satisfaction with their learning environments but has also indicated the complexity of that relationship with respect to students with different content area specializations.

Students generally are expecting more innovative teaching. This expectation assumes immense significance in a teacher education context. Students are undoubtedly looking for good models on which to base their own teaching and are looking to the "experts", the teacher educators, to provide these models. Teacher educators have a strong base to work from - contrary to students expectations, classrooms are pleasant places to be, provide ample opportunity for student involvement, are well organized and cater well for individual differences in students. Teacher educators however need to build on this by utilizing new and exciting learning experiences for students.

Students generally have low expectations of teacher education courses and, depending on their content area specialization, may be affected by these low expectations in different ways. The recruitment patterns of students into the two content area groups is not likely to change dramatically in the near future. Therefore, induction programs and early course

experiences, particularly for Science/Technology students, need to focus on the development of positive perceptions about teaching as a profession and about teacher education courses and institutions.

The transition of Colleges of Advanced Education to University status along with a simultaneous movement to four year degree pre-service teacher education courses and away from the three year diploma courses may help to overcome student perceptions of such institutions and courses as essentially inferior to other tertiary institutions and courses. However, the ultimate responsibility for teacher education courses lies with the teacher educators. Only they can improve students' perceptions of the quality of teacher education courses by their own performance in classrooms. The message is clear that students want their learning experiences to be new and exciting - something they can ultimately model in their own classrooms. In addition, teacher educators along with practising teachers have the responsibility of working together to raise the status of the teaching profession as a whole.

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Table 1

Description and Sample Item of the CUCEI Scales

Scale Name	Scale Description	Sample Item
Individualization	Extent to which students are allowed to make decisions and are treated differentially according to ability, interest or rate of working	Students are allowed to choose activities and how they will work (+)
Innovation	Extent to which the instructor plans new, unusual class activities, teaching techniques and assignments	New and different ways of teaching are seldom used in this class (-)
Involvement	Extent to which students participate actively and attentively in class discussions and activities	The instructor dominates the discussions (-)
Personalization	Emphasis on opportunities for individual students to interact with the instructor and on concern for students' personal welfare	The instructor goes out of his/her way to help students (+)
Satisfaction	Extent of enjoyment of classes	Classes are boring (-)
Student Cohesiveness	Extent to which students know, help and are friendly toward each other	Students in this class get to know each other well (+)
Task Orientation	Extent to which class activities are clear and well organized	Students know exactly what has to be done in our class (+)

Table 2.
Descriptive Statistics for CUCEI Scales by Gender and Course

		CUCEI Scale							
		Personalization	Involvement	Student Cohesiveness	Satisfaction	Task Orientation	Innovation	Individualization	
		Mean Median SD	Mean Median SD	Mean Median SD	Mean Median SD	Mean Median SD	Mean Median SD	Mean Median SD	N
ACTUAL	Overall Results	4.01 4.1 0.66	3.60 3.6 0.68	2.89 2.9 0.93	3.62 3.6 0.83	3.84 3.9 0.47	3.12 3.1 0.78	3.04 3.1 0.73	130
	Male	4.06 4.1 0.51	3.55 3.6 0.63	2.93 2.9 0.87	3.71 4.0 0.72	3.80 3.7 0.49	3.08 3.1 0.63	3.00 2.9 0.78	39
	Female	3.99 4.1 0.71	3.63 3.6 0.71	2.87 2.9 0.96	3.58 3.7 0.87	3.86 4.0 0.46	3.14 3.3 0.83	3.06 3.1 0.72	91
	Arts/Humanities	4.18 4.3 0.58	3.61 3.5 0.75	2.78 2.4 0.98	3.75 4.0 0.91	3.93 4.0 0.44	3.18 3.2 0.78	3.09 3.1 0.77	46
	Science/ Technology	3.91 4.0 0.67	3.60 3.6 0.65	2.94 2.9 0.91	3.54 3.7 0.77	3.79 3.7 0.48	3.09 3.1 0.78	3.01 2.9 0.72	84
PREFERRED	Overall Results	4.39 4.4 0.36	4.14 4.3 0.48	4.00 4.1 0.67	4.43 4.6 0.51	4.06 4.0 0.46	4.05 4.1 0.57	3.73 3.7 0.57	130
	Male	4.25 4.3 0.41	4.02 4.1 0.41	4.03 4.1 0.55	4.39 4.4 0.46	4.00 4.0 0.40	3.89 4.0 0.60	3.61 3.7 0.68	39
	Female	4.44 4.4 0.32	4.19 4.3 0.50	3.99 4.1 0.72	4.45 4.6 0.53	4.08 4.0 0.48	4.11 4.2 0.53	3.78 3.7 0.51	91
	Arts/Humanities	4.41 4.6 0.35	4.24 4.4 0.53	3.97 4.1 0.77	4.47 4.7 0.58	4.04 4.0 0.44	4.19 4.2 0.55	3.83 4.0 0.57	46
	Science/ Technology	4.37 4.4 0.37	4.10 4.1 0.44	4.02 4.1 0.61	4.41 4.4 0.47	4.06 4.1 0.47	3.97 4.1 0.56	3.67 3.7 0.57	84
DISSONANCE	Overall Results	0.38 0.1 0.70	0.53 0.5 0.72	1.11 1.1 1.11	0.80 0.6 0.83	0.21 0.1 0.60	0.93 0.9 0.94	0.68 0.6 0.83	130
	Male	0.19 0.0 0.62	0.47 0.4 0.64	1.10 1.3 1.01	0.68 0.4 0.80	0.20 0.1 0.54	0.81 0.7 0.66	0.61 0.6 0.95	39
	Female	0.46 0.3 0.73	0.56 0.6 0.76	1.12 1.1 1.15	0.86 0.7 0.85	0.22 0.1 0.63	0.98 1.0 1.04	0.71 0.6 0.79	91
	Arts/Humanities	0.22 0.1 0.69	0.62 0.6 0.65	1.19 1.2 1.14	0.69 0.4 0.80	0.10 0.0 0.59	1.03 0.9 0.87	0.73 0.7 0.91	46
	Science/ Technology	0.46 0.3 0.70	0.48 0.5 0.76	1.07 1.1 1.09	0.86 0.7 0.85	0.27 0.3 0.60	0.87 0.9 0.98	0.66 0.6 0.79	84

Table 3

Validity of CUCEI Scales: Comparison with Published Results

Scale		Alpha Reliability			
		Student Actual		Student Preferred	
		CC&D	F&T	CC&D	F&T*
Individualization	Indiv	0.75	0.78	0.62	0.67
	Class	0.90	0.89	0.67	0.80
Innovation	Indiv	0.75	0.81	0.70	0.70
	Class	0.75	0.93	0.82	0.82
Involvement	Indiv	0.70	0.70	0.62	0.65
	Class	0.86	0.81	0.83	0.79
Personalization	Indiv	0.78	0.75	0.50	0.68
	Class	0.97	0.85	0.50	0.81
Satisfaction	Indiv	0.86	0.88	0.69	0.82
	Class	0.98	0.96	0.91	0.90
Student Cohesiveness	Indiv	0.88	0.90	0.79	0.78
	Class	0.95	0.95	0.94	0.90
Task Orientation	Indiv	0.45	0.75	0.51	0.63
	Class	0.62	0.85	-0.13	0.78

* "CC&D" - Clarke, Chant and Dart;
"F&T" - Fraser and Tregaust

Table 4.
Satisfaction[1] by Gender and Course

Gender	Satisfaction	Course		Total
		Arts/Humanities	Sci/Technology	
Male	Total Low,High % High	16 5,11 68.8%	23 10,13 56.5%	39
Female	Total Low,High % High	30 10,20 66.7%	61 40,21 34.4%	91
Total		46	84	130

[1] The percentage obtaining more than median satisfaction.

Table 5.
Logistic Regression Analysis of Satisfaction by Gender and Course

Source of Variation	d.f.	Chi-squared	P-value
Gender	1	2.42	0.120
Course	1	8.19	0.004
Gender•Course	1	1.94	0.163

Table 6.
Satisfaction[1] by CUCEI Scales, Course and Actual-Dissonance Interaction

ARTS/HUMANITIES			DISSONANCE											
			Personaliz-ation		Involvement		Student Cohesiveness		Task Orientation		Innovation		Individual-ization	
			L	H	L	H	L	H	L	H	L	H	L	H
ACTUAL	Low	Total	1	12	5	17	2	22	5	12	3	19	1	20
		Low,High	1, 0	8, 4	2, 3	10, 7	2, 0	8,14	3, 2	3, 9	2, 1	8,11	0, 1	12, 8
		%High	0.0%	33.3%	60.0%	41.2%	0.0%	63.6%	40.0%	75.0%	33.3%	57.9%	100.0%	40.0%
		(E,O)	?	(3,3)	?	(3,3)	?	(3,2)	?	(3,2)	?	(3,2)	?	(3,3)
	High	Total	20	5	17	3	17	1	18	4	16	2	17	3
		Low,High	4,16	0, 5	1,16	0, 3	3,14	1, 0	4,14	1, 3	3,13	1, 1	2,15	0, 3
		%High	75.0%	100.0%	94.1%	100.0%	82.4%	0.0%	77.8%	75.0%	81.3%	50.0%	88.2%	100.0%
		(E,O)	(2,2)	(1,1)	(2,2)	(1,1)	(2,1)	(1,3)	(2,1)	(1,2)	(2,1)	(1,3)	(2,2)	(1,1)
Expected Order?			Yes		Yes		No		Yes[2]		No		Yes	
Independents' Rank			4th		3rd		4th		4th		4th		1st	
SCI/TECH			L	H	L	H	L	H	L	H	L	H	L	H
ACTUAL	Low	Total	5	34	5	32	11	36	9	31	3	34	8	33
		Low,High	1, 4	28, 6	4, 1	28, 4	7, 4	26,10	6, 3	22, 9	2, 1	27, 7	3, 5	27, 6
		%High	80.0%	17.6%	20.0%	12.5%	36.4%	27.8%	33.3%	29.0%	33.3%	20.6%	62.5%	18.2%
		(E,O)	?	(3,3)	?	(3,3)	?	(3,3)	?	(3,3)	?	(3,3)	?	(3,3)
	High	Total	22	7	35	5	20	7	22	11	33	5	32	5
		Low,High	7,15	4, 3	10, 25	4, 1	14, 6	3, 4	11,11	6, 5	15,18	3, 2	14,18	3, 2
		%High	68.2%	42.9%	71.4%	20.0%	30.0%	57.1%	50.0%	45.5%	54.5%	40.0%	56.3%	40.0%
		(E,O)	(2,1)	(1,2)	(2,1)	(1,2)	(2,2)	(1,1)	(2,1)	(1,2)	(2,1)	(1,2)	(2,1)	(1,2)
Expected Order?			Yes*		Yes*		Yes		Yes*		Yes*		Yes*	
Independents' Rank			1st		3rd		3rd		3rd		3rd		1st	

[1] The percentage obtaining more than median satisfaction.
[2] Within each CUCEI scale, only those strictly less or strictly greater than the median score are included in subsequent analyses.
[3] The 4 types are 1: (Low Actual, Low Dissonance) - "Independents" No expected ranking.
2: (Low Actual,High Dissonance) - "Acerbics" Expected ranking: 3rd
3: (High Actual, Low Dissonance) - "Empathetics" Expected ranking: 2nd (or 1st (*)).
4: (High Actual,High Dissonance) - "Impressed" Expected ranking: 1st (or 2nd (*)).
E refers to the expected ranking of achievement, O to the observed ranking.

Table 7.

Significance[1] of Actual-Dissonace Combinations within Courses

ARTS & HUMANITIES Source	CUCEI Scale					
	Personaliz-ation	Involvement	Student Cohesiveness	Task Orientation	Innovation	Individual-ization
	P-value	P-value	P-value	P-value	P-value	P-value
Actual	**.001**	**.007**	.260	.209	.273	.091
Dissonance	.098	.584	.617	.322	.791	.698
Actual•Dissonance	.974	.470	**.009**	.348	.224	.129
SCIENCE & TECHNOLOGY Source						
Actual	.480	**.047**	.450	.195	.249	.597
Dissonance	**.006**	**.047**	.689	.729	.435	**.023**
Actual•Dissonance	.192	.281	.188	.975	.887	.303

[1] From logistic regression analyses of data in Table 6.

Table 8.
Structural Equations Model: Standardized Direct Effects for Actual Satisfaction by Course

ARTS/ HUMANITIES

SA = -0.01·G + 0.11·PA1 - 0.10·PA2 + 0.11·AGE
(0.10) (0.15) (0.15) (0.09)
+ 0.17·PA - 0.13·PD + 0.83·IVA + 0.38·IVD + 3.43·CA + 2.39·CD - 2.98·CA2 - 1.45·CACD - 0.85·CD2
(0.33) (0.32) (0.33) (0.25) (1.44) (1.25) (1.19) (0.81) (0.38)
[0.01] [0.02] [0.06] [0.01] [0.07] [0.02]
- 0.18·INA - 0.07·IND + 0.26·IDA + 0.11·IDD
(0.25) (0.22) (0.18) (0.19)
Squared multiple correlation = 0.79

SCIENCE/ TECHNOLOGY

SA = -0.11·G - 0.11·PA1 + 0.04·PA2 + 0.15·AGE
(0.08) (0.10) (0.09) (0.08)
[0.06]
+ 0.26·PA + 0.08·PD + 0.43·IVA + 0.17·IVD - 0.04·CA - 0.09·CD
(0.20) (0.21) (0.17) (0.18) (0.17) (0.21)
[0.01]
+ 0.18·INA + 0.08·IND + 0.09·IDA - 0.23·IDD
(0.17) (0.18) (0.21) (0.17)
[0.07]
Squared multiple correlation = 0.59

Notes:

(i) Notation for variables:

SA	: Actual Satisfaction		
G	: Gender: An indicator variable coded 0 (males), 1 (Females)		
PA1	: Prior Achievement in "Learners and Teachers".		
PA2	: Prior Achievement in "School, Community and Society".		
AGE	: An indicator variable coded 0 (at most 21 years), 1 (at least 22 years)		
PA	: Personalization (Actual)	PD	: Personalization (Dissonance)
IVA	: Involvement (Actual)	IVD	: Involvement (Dissonance)
CA	: Student Cohesiveness (Actual)	CD	: Student Cohesiveness (Dissonance)
INA	: Innovation (Actual)	IND	: Innovation (Dissonance)
IDA	: Individualization (Actual)	IDD	: Individualization (Dissonance)

For the Arts/Humanities model, the following curvature terms are introduced

CA2 = CA·CA CACD = CA·CD CD2 = CD·CD

(ii) Solution: the estimates of the direct effects and their standard errors (in round brackets) are for the standardized solution, based on the correlation matrix. The P-values (in square brackets) for the significance of the direct effects are from the unstandardized solution, based on the covariance matrix.

Table 9.
Final Achievement[1] by Course

Achievement	Course		Total
	Arts/Humanities	Sci/Technology	
Total	46	84	130
Low,High[2]	25,21	59,25	
% High	45.7%	29.8%	

[1]The percentage obtaining "High" grades of 6 or 7
[2]Chi-square for course main effect of course is 3.24 (1 d.f.), P = 0.07.

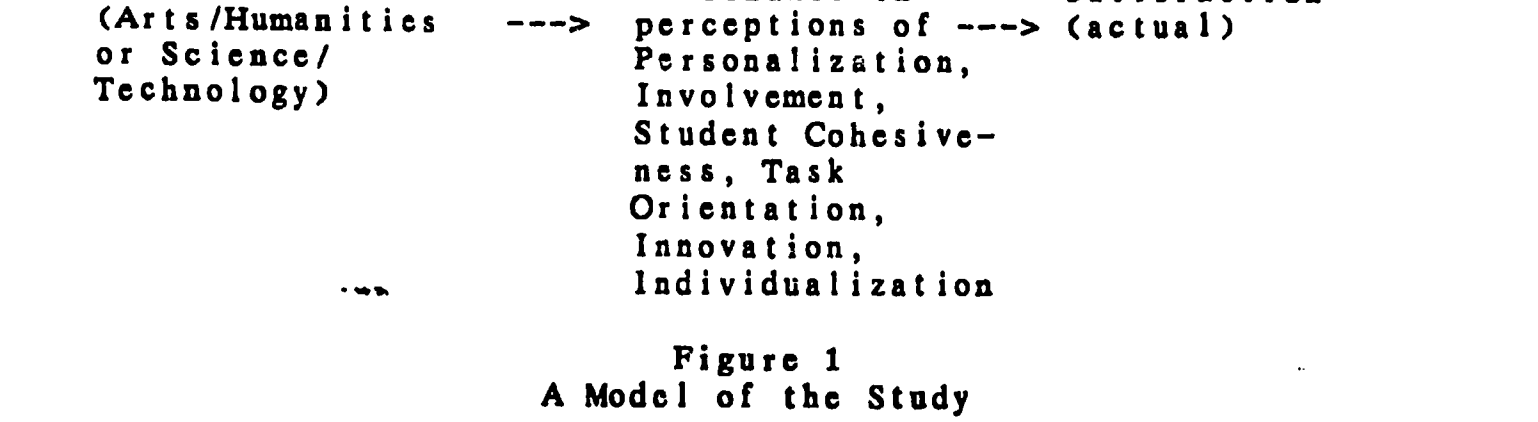

Figure 1
A Model of the Study

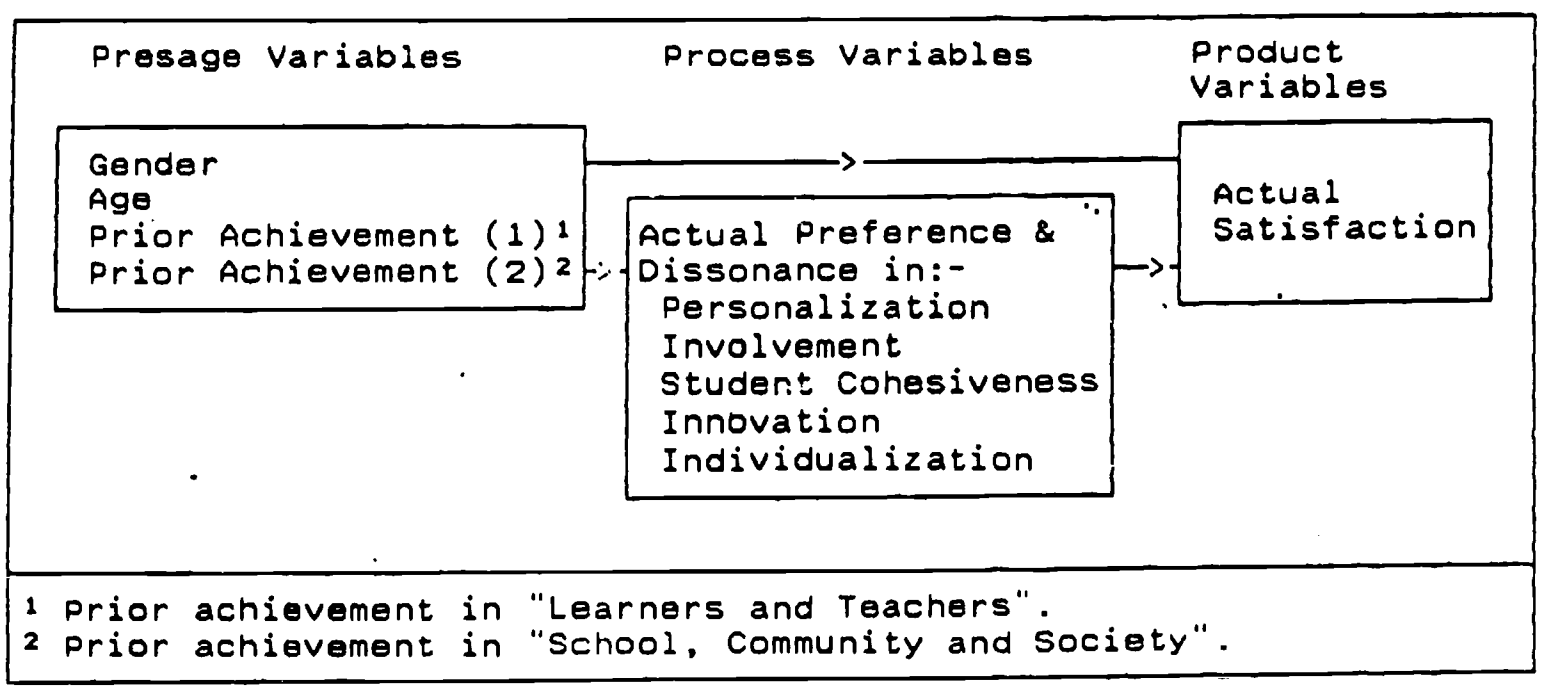

Figure 2.
A Simple Structural Equations Model with Actual Satisfaction as Outcom